

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I and Species A in the reply filed on 09/23/2009 is acknowledged. The traversal is on the ground(s) that protective caps are being different than the interconnect (see page 2 of Applicant's Election). This is not found persuasive because recitation regarding "the protective caps" is not a common technical feature between Groups I and II, and therefore the prior art does not need to teach it.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 5, 7-8 and 10 and 14 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 09/23/2009.

Claim Objections

3. Claim 1 is objected to because of the following informalities:

- "the front and the back electrode" is recited in lines 9-10, although "the front and the back electrodes" is intended; and
- "front and back groove" is recited in line 10, although "front and back grooves" is intended.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-4, 6, 9 and 11-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "front and back groove" in line 10. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 also recites the limitation "the non-TCO side" in line 12. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Van Andel et al. (WO 98/13882).

Regarding claim 1, Van Andel discloses a process for manufacturing a solar cell foil (see fig. 1-13, claims 1 and 11; page 9, lines 10-11, page 11, line 18 - page 17, line 2) comprising the steps of:

- providing an etchable temporary substrate (1) (fig. 1 and page 17, line 26-27);

- applying a transparent conductor (2) made of F-doped SnO_2 as the front electrode onto the temporary substrate (1) (fig. 2 and page 18, lines 1-5);
- applying a photovoltaic layer (PV layer 6) onto the transparent conductor (2) (fig. 5, page 18, lines 11-15);
- applying an aluminum layer (10) as the back electrode layer;
- applying a permanent carrier (14) (figs. 11 and 12; page 19, lines 1-4);
- ensuring the front electrode (2) and the back electrode (10) are electrically connected in an interconnect to establish a series connection (figs. 8-10; page 17, lines 7-15; page 18, lines 23-27), the front (2) and the back (10) electrodes each being interrupted by a front (grooves 5 as shown in fig. 4) and back (grooves 12 as shown in fig. 10) grooves, respectively, at different sides of the interconnect (see figs. 4 and 10 for configuration);
- in any of the preceding steps providing an etch resist on the non-TCO side of the temporary substrate (1) at least at the location of the interconnect, and at least not at the entire location of the front groove (5); and
- selectively removing the temporary substrate (1) where it is not covered with etch resist (figs. 11-13; page 5, lines 12-21; page 16, line 27 to page 17, line 2; page 19, lines 1-7).

It is Examiner's position that Van Andel inherently discloses the etch resist is not provided at the entire location of the front groove, because the temporary substrate (1) is made of metal (page 9, lines 10-11; page 17, lines 26-27) and leaving a rest of such substrate covering the front groove would produce a short-circuit between two adjacent

stripes (4) of transparent conductive oxide, and thus the solar cell foil of Van Andel would not function properly.

Regarding claim 6, Van Andel further discloses that the process is carried out in a roll-to-roll process (page 1, lines 15-21; page 3, lines 4-9).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 2 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Andel as applied to claim 1 above.

Regarding claim 2, Applicant is directed above for complete discussion of claim 1, which is incorporated herein. Van Andel further discloses that the step of applying the etch resist on the non-TCO side of the temporary substrate (1) is performed before the step of selectively removing the temporary substrate (1) where it is not covered with etch resist (page 16, line 27 to page 17, line 2). Although the reference is silent as to

whether the step of applying the etch resist on the non-TCO side of the temporary substrate is performed directly before the step of selectively removing the temporary substrate, selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results (MPEP §2144.04 IV(C); *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)).

Regarding claim 11, Van Andel further discloses that the process is carried out in a roll-to-roll process (page 1, lines 15-21; page 3, lines 4-9).

11. Claims 1-2 and 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Andel et al. (WO 98/13882).

Regarding claim 1, Van Andel discloses a process for manufacturing a solar cell foil (see fig. 1-13, claims 1 and 11; page 9, lines 10-11, page 11, line 18 - page 17, line 2) comprising the steps of:

- providing an etchable temporary substrate (1) (fig. 1 and page 17, line 26-27);
- applying a transparent conductor (2) made of F-doped SnO_2 as the front electrode onto the temporary substrate (1) (fig. 2 and page 18, lines 1-5);
- applying a photovoltaic layer (PV layer 6) onto the transparent conductor (2) (fig. 5, page 18, lines 11-15);
- applying an aluminum layer (10) as the back electrode layer;
- applying a permanent carrier (14) (figs. 11 and 12; page 19, lines 1-4);
- ensuring the front electrode (2) and the back electrode (10) are electrically connected in an interconnect to establish a series connection (figs. 8-10;

page 17, lines 7-15; page 18, lines 23-27), the front (2) and the back (10) electrodes each being interrupted by a front (grooves 5 as shown in fig. 4) and back (grooves 12 as shown in fig. 10) grooves, respectively, at different sides of the interconnect (see figs. 4 and 10 for configuration);

- in any of the preceding steps providing an etch resist on the non-TCO side of the temporary substrate (1) at least at the location of the interconnect, and at least not at the entire location of the front groove (5); and
- selectively removing the temporary substrate (1) where it is not covered with etch resist (figs. 11-13; page 5, lines 12-21; page 16, line 27 to page 17, line 2; page 19, lines 1-7).

It is Examiner's position that Van Andel inherently discloses the etch resist is not provided at the entire location of the front groove, because the temporary substrate (1) is made of metal (page 9, lines 10-11; page 17, lines 26-27) and leaving a rest of such substrate covering the front groove would produce a short-circuit between two adjacent stripes (4) of transparent conductive oxide, and thus the solar cell foil of Van Andel would not function properly. In an alternative, it would have been obvious to one of ordinary skill in the art at the time of the invention to have the etch resist of Van Andel not provided at the entire location of the front groove such that the short-circuit between two adjacent stripes (4) of transparent conductive oxide could be avoided.

Regarding claim 2, Applicant is directed above for complete discussion of claim 1, which is incorporated herein. Van Andel further discloses that the step of applying the etch resist on the non-TCO side of the temporary substrate (1) is performed before the

step of selectively removing the temporary substrate (1) where it is not covered with etch resist (page 16, line 27 to page 17, line 2). Although the reference is silent as to whether the step of applying the etch resist on the non-TCO side of the temporary substrate is performed directly before the step of selectively removing the temporary substrate, selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results (MPEP §2144.04 IV(C); *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)).

Regarding claims 6 and 11, Van Andel further discloses that the process is carried out in a roll-to-roll process (page 1, lines 15-21; page 3, lines 4-9).

12. Claims 3-4, 9 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Andel as applied to claim 1 and/or 2 above, and further in view of Morikawa et al. (US 56637510).

Regarding claims 3 and 9, Applicant is directed above for complete discussion of claim 1 and/or 2, which is incorporated herein. However, the reference is silent as to whether the etch resist is a permanent etch resist.

Morikawa teaches a method of selective etching of a temporary substrate of a solar cell wherein a permanent etch resist is utilized to etch away the portion of the substrate which is not covered by the etch resist (see fig.1 and 4:20-35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the permanent etch resist of Morikawa in the method of Van Andel in order to selectively etch away the portion of the substrate not

covered by the etch resist, as shown by Morikawa, and also desired by Van Andel (page 16, line 27 to page 17, line 2).

Regarding claim 4, Van Andel in view of Morikawa further discloses that the color of the etch resist is selected such that it matches or contrasts with the color of the energy-generating part of the solar cell unit.

Regarding claims 12-13, Van Andel in view of Morikawa further discloses that the process is carried out in a roll-to-roll process (page 1, lines 15-21; page 3, lines 4-9).

13. Claims 1-2 and 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Andel et al. (WO 98/13882) in view of Jordan et al. (US 4,243,432).

Regarding claim 1, Van Andel discloses a process for manufacturing a solar cell foil (see fig. 1-13, claims 1 and 11; page 9, lines 10-11, page 11, line 18 - page 17, line 2) comprising the steps of:

- providing an etchable temporary substrate (1) (fig. 1 and page 17, line 26-27);
- applying a transparent conductor (2) made of F-doped SnO_2 as the front electrode onto the temporary substrate (1) (fig. 2 and page 18, lines 1-5);
- applying a photovoltaic layer (PV layer 6) onto the transparent conductor (2) (fig. 5, page 18, lines 11-15);
- applying an aluminum layer (10) as the back electrode layer;
- applying a permanent carrier (14) (figs. 11 and 12; page 19, lines 1-4);

- ensuring the front electrode (2) and the back electrode (10) are electrically connected in an interconnect to establish a series connection (figs. 8-10; page 17, lines 7-15; page 18, lines 23-27), the front (2) and the back (10) electrodes each being interrupted by a front (grooves 5 as shown in fig. 4) and back (grooves 12 as shown in fig. 10) grooves, respectively, at different sides of the interconnect (see figs. 4 and 10 for configuration);
- in any of the preceding steps providing an etch resist on the non-TCO side of the temporary substrate (1) at least at the location of the interconnect, and at least not at the entire location of the front groove (5); and
- selectively removing the temporary substrate (1) where it is not covered with etch resist (figs. 11-13; page 5, lines 12-21; page 16, line 27 to page 17, line 2; page 19, lines 1-7).

It is Examiner's position that Van Andel inherently discloses the etch resist is not provided at the entire location of the front groove, because the temporary substrate (1) is made of metal (page 9, lines 10-11; page 17, lines 26-27) and leaving a rest of such substrate covering the front groove would produce a short-circuit between two adjacent stripes (4) of transparent conductive oxide, and thus the solar cell foil of Van Andel would not function properly. In addition, Jordan teaches a method of making a solar cell foil wherein the adjacent SnO_2 strips (12) strips are isolated from one another (fig. 2, 6:1-21). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have the etch resist of Van Andel not provided at the entire

location of the front groove such that the short-circuit between two adjacent stripes (4) of transparent conductive oxide could be avoided.

Regarding claim 2, Applicant is directed above for complete discussion of claim 1, which is incorporated herein. Van Andel further discloses that the step of applying the etch resist on the non-TCO side of the temporary substrate (1) is performed before the step of selectively removing the temporary substrate (1) where it is not covered with etch resist (page 16, line 27 to page 17, line 2). Although the reference is silent as to whether the step of applying the etch resist on the non-TCO side of the temporary substrate is performed directly before the step of selectively removing the temporary substrate, selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results (MPEP §2144.04 IV(C); *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)).

Regarding claims 6 and 11, Van Andel further discloses that the process is carried out in a roll-to-roll process (page 1, lines 15-21; page 3, lines 4-9).

14. Claims 3-4, 9 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Andel in view of Jordan as applied to claim 1 and/or 2 above, and further in view of Morikawa et al. (US 56637510).

Regarding claims 3 and 9, Applicant is directed above for complete discussion of claim 1 and/or 2, which is incorporated herein. However, the reference is silent as to whether the etch resist is a permanent etch resist.

Morikawa teaches a method of selective etching of a temporary substrate of a solar cell wherein a permanent etch resist is utilized to etch away the portion of the substrate which is not covered by the etch resist (see fig.1 and 4:20-35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the permanent etch resist of Morikawa in the method of Van Andel in view of Jordan in order to selectively etch away the portion of the substrate not covered by the etch resist, as shown by Morikawa, and also desired by Van Andel (page 16, line27 to page 17, line 2).

Regarding claim 4, Van Andel in view of Jordan and Morikawa further discloses that the color of the etch resist is selected such that it matches or contrasts with the color of the energy-generating part of the solar cell unit.

Regarding claims 12-13, Van Andel in view of Jordan and Morikawa further discloses that the process is carried out in a roll-to-roll process (page 1, lines 15-21; page 3, lines 4-9).

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GOLAM MOWLA whose telephone number is (571) 270-5268. The examiner can normally be reached on M-F, 0900-1700 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JENNIFER MICHENER can be reached on (571) 272-1424 until Dec 31, 2009, or ALEXA NECKEL can be reached on (571) 272-1446 from January 2009,

onwards. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. M./
Examiner, Art Unit 1795

/Jennifer K. Michener/
Supervisory Patent Examiner, Art Unit 1795